



JUNE 1999

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# Louisiana COAST LINES

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LOUISIANA DEPARTMENT OF NATURAL RESOURCES

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## The 1999 Hurricane Season Has Arrived

The Gulf of Mexico hurricane season began June 1 and extends through November 30. According to the National Hurricane Center, this period is when weather conditions are the most ripe for hurricane development. Most hurricanes occur in August, September, and October. On the average, our region experiences about six tropical storms each season, with an actual strike occurring once every two years. One hurricane forecaster, William Gray, has predicted that the 1999 Atlantic hurricane activity is likely to be above average (see accompanying article). He estimates that there will be 14 named storms, nine hurricanes, and four major (intense) storms. During the 1998 hurricane season we experienced 14 named storms, nine hurricanes, and three major (intense) hurricanes. It is possible that we are entering an extended active period, which could produce more hurricanes than usual for several seasons.

A hurricane usually begins in an area over a warm ocean where winds coming from different directions converge. After having maintained its identity for at least 24 hours, this moving area of thunderstorms is termed a *tropical disturbance*. These systems gain their strength from heat

released by condensing water vapor and the rotation of the earth. Tropical disturbances having counter-clockwise motion and winds no greater than 39 miles per hour (mph) are considered *tropical depressions*. These depressions become *tropical storms* when their wind speed increases to between 40 and 74 mph. It is at this point that the storm is given a name. If the storm maintains its counter-clockwise circulation and has sustained winds of 75 mph or greater, the storm is then classified a *hurricane*.

Usually accompanying tropical storms and hurricanes are high winds and heavy rainfall. Following initial impact, when the center of a hurricane passes over a fixed point, there is a period of relative calm as the *eye* of the hurricane passes over the area. This calm is characterized by extremely low barometric pressure and is sometimes accompanied by a small rise in temperature and clearing skies. This quiet is short-lived (about a half-hour) and is followed by a period of more wind and rain. This time, however, the strong winds will be coming from the opposite direction.

Perhaps the most serious effect of a hurricane is the destruction to coastal areas that can result from the storm

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surge. The storm surge associated with a hurricane is usually the storm's biggest killer. These storm surges often cause much erosion and breaching of barrier islands. A *storm surge* is an irregular, accelerated rise in sea level that occurs temporarily along an open coast during a hurricane or other storm. The rise is caused mainly by onshore wind stresses or by a drop in atmospheric pressure, and results in large amounts of water being "thrown" against the coast. The surge acts like a giant bulldozer, sweeping everything in its path. Storm surges are most destructive when accompanied by high tides since height of the tide is added to the height of the storm surge.

When the threat of hurricane conditions are expected in an area within 24 to 36 hours, a *hurricane watch* is issued. A hurricane watch does not guarantee an actual hit by a hurricane, but the probability is considerably high. A *hurricane warning* is issued when actual hurricane conditions (winds of 74 mph or greater, or dangerously high water and rough seas) are expected in 24 hours or less. If a watch becomes a warning, the storm is likely. It may be a direct hit or just a glancing blow.

The strength of a hurricane is ranked from a category one (minimal) to a category five (catastrophic) storm on what is known as the Saffir-Simpson hurricane intensity scale (see table below). Although tropical storms are not ranked on this scale, they can produce extensive damage with

rainfall-produced flooding. The force of a hurricane is governed by an area's barometric pressure (air pressure). Barometric pressure refers to the pressure exerted by the atmosphere on any surface beneath or within it. The lower the pressure, the higher the winds.

For the Atlantic Basin, of which Louisiana is a part, the number of intense hurricanes (category 3-5) has declined during the 1970's and 80's, both in intensity as well as those making landfall along the U.S. coastline. Category three, four, and five storms cause over 70% of the damage but account for only 20% of the landfalls.

From 1950 to 1952, storms were identified by the phonetic alphabet (Able, Baker, Charlie, etc.), but the U.S. National Weather Service (NWS) switched to women's names in 1953. In 1979, men's names were for the first time included in the list of Atlantic, Caribbean, and Gulf of Mexico tropical storms and hurricanes. If a hurricane becomes strong and causes significant damage, its name is retired from the list and will not be used again. Some of the names that have been retired from the list include Audrey, Camille, Hugo, and Andrew.

The names for this year's Atlantic storms are: Arlene, Bret, Cindy, Dennis, Emily, Floyd, Gert, Harvey, Irene, Jose, Katrina, Lenny, Maria, Nate, Ophelia, Philippe, Rita, Stan, Tammy, Vince, and Wilma.

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## Saffir-Simpson Scale

| Strength   | Wind Speed(Kts) | Wind Speed(MPH) | Pressure(Millibars) | Pressure        |
|------------|-----------------|-----------------|---------------------|-----------------|
| Category 1 | 65- 82 kts      | 74- 95 mph      | >980 mb             | 28.94 "Hg       |
| Category 2 | 83- 95 kts      | 96-110 mph      | 965-979 mb          | 28.50-28.91 "Hg |
| Category 3 | 96-113 kts      | 111-130 mph     | 945-964 mb          | 27.91-28.47 "Hg |
| Category 4 | 114-135 kts     | 131-155 mph     | 920-944 mb          | 27.17-27.88 "Hg |
| Category 5 | > 136 kts       | < 155 mph       | 916 mb              | 27.16 "Hg       |



## Engineering Work Begins on Three Coastal Projects

Coastal managers at the Department of Natural Resources (DNR) have begun engineering design and construction plans on three coastal restoration projects. The projects located in Terrebonne, Vermilion, Iberia, and Cameron parishes feature water management techniques and altered hydrology to increase marshland, fish, and wildlife productivity.

Oaks/Avery Canal Hydrologic Restoration (Vermilion and Iberia parishes), Lake Boudreaux Basin Freshwater Introduction and Hydrologic Management (Terrebonne Parish) and Black Bayou Hydrologic Restoration (Cameron Parish) are funded by federal/state monies through the Breaux Act, also known as CWPPRA.

Project features are as follows:

**Oaks/Avery Canal Hydrologic Restoration** consists of bank stabilization with rock, water control structures, spoil bank maintenance, sediment fencing and vegetative plantings. A low level rock weir will provide protection to a critically eroding bank-line and shoreline areas along Oaks Canal, Vermilion Bay, Union Oil Canal, and Avery Canal. Along with DNR, the federal sponsor is the Natural Resources Conservation Service. Acadian Environmental, Inc. of Eunice was awarded an engineering contract at the cost of \$162,905 to assist in the project.

**Lake Boudreaux Basin Freshwater Introduction and Hydrologic Management** will increase the flow of freshwater and nutrients from Bayou Pelton into the upper Lake Boudreaux watershed located just southwest of Chauvin. The introduction of freshwater will reduce the negative effects of saltwater intrusion

in the area and will promote vegetative diversity. The project will feature dredging and construction of seven sluice gates and water structures. Federal project sponsor is the U.S. Fish and Wildlife Service. At a cost of \$199,581, Gulf Engineers & Consultants, Inc. of Baton Rouge will work on the feasibility phase of the project, with the design phase to follow. The total project area includes 3,755 acres of intermediate marsh, 1,640 acres of brackish marsh and 1,827 acres of open water.

**Black Bayou Hydrologic Restoration** is aimed at protecting and restoring marsh in the northwestern part of the Calcasieu-Sabine Basin including 25,529 acres of fresh/intermediate marsh and brackish marsh. The project will divert freshwater from the GIWW and create a hydrologic head that maximizes freshwater retention time and reduces saltwater intrusion and tidal action. Project features include a rock dike west of the Gum Cove Ridge, as well as a rock weir with a boat bay at the intersection of Block's Creek and Black Bayou. Installation of 133,000 linear feet of vegetative plantings is also planned. Design and modeling assistance on the project will be provided by C. H. Fenstermaker & Associates, Inc. of Lafayette at a cost of \$384,895. DNR and the National Marine Fisheries Service sponsor this CWPPRA project.

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## The "Mean" Season

Last year's hurricane season was called "mean" by forecasters and predictions are that this year's storm season could be even meaner.

William Gray, a hurricane forecaster at Colorado State University, has predicted that this year's season will be very active. He said it could surpass the 1998 season in terms of storm activity.

Gray is predicting this season will produce 14 tropical storms, 10 of which will become hurricanes and four of those will be declared strong/intense.

"The odds favor an active year because the climate signals that we've seen out there are similar to the precursor climate signals of rather active years," Gray said. That means signs are favorable for a season as active, maybe even more active, than 1998.

The 1998 season was the deadliest in more than 200 years, according to the National Ocean and Atmospheric Administration. The season produced 14 tropical storms, 10 of which became hurricanes, including the devastating Hurricane Mitch.

These storms accounted for \$3.2 billion in insured damages and 21 deaths in the United States. Central America, though, experienced the greatest destruction from the storm systems.

Hurricane Mitch, which formed Oct. 21 and was officially declared dead Nov. 5, caused more than 12,000 deaths in Central America with several thousand people still missing in Honduras, Nicaragua and El Salvador. No accurate dollar estimate has been released by the nations of

Central America from that storm.

Gray said the signals he and other researchers are studying that indicate an active storm season include:

- ° The persistence of La Niña, an upwelling of cold water in the eastern equatorial Pacific Ocean;
- ° Stratospheric westerly winds;
- ° North Atlantic water temperatures on the warm side and higher sea-surface temperatures for the entire Atlantic; and
- ° Existing and projected sea-surface barometric pressures for the Caribbean Basin and western Atlantic that are below average.

"An important factor with all this, I think, is that we believe we've entered this new era for storm activity," Gray said. "There was a big change in the climate signals between 1994 and 1995, when the North Atlantic temperatures changed a lot and climate signals began to alter, not just in the Atlantic but around the globe.

"We think these changes are normal, natural changes that are not due to anything humankind has imposed, such as a warming effect from greenhouse gases," Gray said he wanted his prediction to be considered a warning since the four hurricanes projected to be in the intense category could become a threat to any of the Atlantic coastal areas.

He said that while intense storms, those in the Category 3 status and above, make up only 25 percent of all storms, they cause about 85 percent of the damage.

"The problem with that is that we've had such an increase in property and population along the southeast U.S.



coast and the Florida peninsula,” Gray said. With the exception of Hurricane Andrew in 1992, and Hurricane Mitch last year, the U.S. coastal area has not experienced the cycle of intense, landfalling storms that smashed the East Coast from the late 1920s through the late 1960s.

“A lot of people feel El Niño-La Niña is the factor that causes hurricane activity to go up or down, but it’s only one among many,” Gray said.

“Stratospheric winds, West African rains, Atlantic sea-surface temperatures, Atlantic barometric pressures and other factors around the globe also affect hurricanes.”

In a joint press conference, Secretary of Commerce William M. Daley; NOAA administrator James Baker; Jerry Jarrell, director of the National Weather Service’s National Hurricane Center; and Hugh Willoughby, director of NOAA’s Hurricane Research Center in Miami, all echoed Gray’s forecast.

“Our investment in technology has enhanced our ability to make better hurricane predictions,” Baker said. “We, as a nation, need to continue striving toward better hurricane track forecasts.”

These agencies are attempting to give coastal regions a better sense of where a storm is heading and as much lead time as possible for civil defense officials to order an evacuation if needed. The payoff is in lives saved, he said.

Jarrell said that the 1998 season actually got off to a late start, with the first named storm not forming until July 27.

“In a remarkable span of 35 days between August 19 and September 2, ten named tropical storms formed,” Jarrell said. “That’s nearly a whole

year’s worth of activity crammed into little more than a month.”

The upswing in intense storms could be something that may continue well past the year 2000, Jarrell said.

“People have been saying for several years that we may be heading back to a period similar to the 1940s and ’50s when we really had strong hurricane seasons - a lot of major hurricanes,” Jarrell said. “I think it’s no longer speculation. I think we are in it now.”

Willoughby said that one thing helping this year’s forecast is the amount of information recorded during the 1998 season.

NOAA scientists, working with NASA and University of Colorado forecasters such as Gray, “conducted the most complete and sophisticated campaign of observations in hurricanes ever,” Willoughby said. “In Bonnie, Danielle and Georges, we had six or seven aircraft observing the same hurricane at the same time.”

Because of advanced aircraft and satellites being used, Willoughby said, “We can study and understand hurricanes on all scales, from a single raindrop to hemisphere-wide winds that control the storm’s motion.”

Daley said that as the population of the Gulf Coast, the Florida peninsula, and the East Coast continues to grow, preparing now for a storm can save lives in the future.

The first storm of the 1999 storm season began on June 11. Although only a tropical depression, it was upgraded to a tropical storm by the next day and given the name Arlene. This storm did not last a week and did no damage. We can only hope that future storms will be as kind as the first.

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## Citizens to Benefit From Coastal Projects

Seven resource enhancement projects recently approved across coastal Louisiana will allow citizens better access to coastal resources. According to Greg DuCote, program manager Interagency Affairs for DNR's Coastal Management Division, "These are projects that people can visit and enjoy, and at the same time use to develop a better understanding of our coast."

"This is also a good example of cooperation between federal, state, and local governments in helping our citizens use our natural resources while also providing educational opportunities for them," Ducote added.

The enhancement projects are funded by a federal grant from the National Oceanic and Atmospheric Administration. State government and local sponsors provide matching funds accounting for at least 50 percent of the total project cost. The federal funding for these projects located in

Cameron, Jefferson, Lafourche and St. Bernard parishes is \$82,000. Ducote said this second year of funding authorized by the U.S. Coastal Zone Management Act, § 306A allowed for the following projects:

**Beach Access Walkway**

(Cameron Parish)

**Maritime Fisheries Museum**

(Jefferson Parish)

**Bonnabel Buoy**

(Jefferson Parish)

**Leeville Park**

(Lafourche Parish)

**Oakridge Park**

(Lafourche Parish)

**Larousse Wharf Extension and Lighting**

(Lafourche Parish)

**Marine Terminal Observation Deck**

(St. Bernard Parish)

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